

THE CLAIMS

What is claimed is:

- 5 1. An article comprising an amorphous silicon carbide thin film on a structure selected from the group consisting of:

substrates that are transmissive to at least one of light and infrared radiation;

structures adversely affected by exposure to radio frequency and/or microwave radiation thereon;

10 shielding members for protection of structures adversely affected by exposure to radio frequency and/or microwave radiation thereon;

structures susceptible to chemical attack and/or thermal degradation in their end use environments; and

electronic circuitry structures susceptible to diffusional release and/or diffusional receipt of atomic species in use thereof.

- 15 17. An electromagnetic interference shielded assembly, comprising:

a structure disposed in protective relationship to a region to be shielded; and

an electrically conductive thin film of amorphous silicon carbide on at least a portion of said structure.

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The electromagnetic interference shielded assembly of claim 17, wherein the thin film exhibits sufficient conductivity to provide a ground path for electromagnetic interference induced currents and exhibits sufficient optical transparency to pass optical signals through the window without substantial attenuation.

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The electromagnetic interference shielded assembly of claim 17, wherein the thin film exhibits an electrical resistivity in the range from about 10 mΩ cm to about 25 mΩ cm.

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The electromagnetic interference shielded assembly of claim 17, wherein the thin film has been deposited on the structure by a process selected from the group consisting of chemical vapor deposition, plasma enhanced chemical vapor deposition, RF glow discharge, RF sputtering, ion cluster beam deposition, ion beam sputtering, sol gel coating, reactive sputtering, plasma spray, reactant spraying, microwave discharge, and photo CVD.

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The electromagnetic interference shielded assembly of claim 17, wherein the thin film comprises a sputtered thin film.

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The electromagnetic interference shielded assembly of claim 17, wherein the thin film has a thickness in the range from about 0.025 micron to about 10 microns.

23. The electromagnetic interference shielded assembly of claim 17, wherein the thin film has a thickness in the range from about 0.05 micron to about 1.0 micron.

24. The electromagnetic interference shielded assembly of claim 17, wherein the thin film is formed with a thickness in the range from about 0.1 micron to about 0.5 micron.

25. The electromagnetic interference shielded assembly of claim 17, further comprising a glue layer between the structure and the thin film.

26. The electromagnetic interference shielded assembly of claim 25, wherein the glue layer comprises a material selected from the group consisting of Ti, Si, Cr, and Zr.

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27. A sensor assembly, comprising:

a sensor; and

an amorphous silicon carbide thin film on at least part of the sensor.

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28. The sensor assembly of claim 27, wherein the thin film has a thickness in the
range from about 0.025 micron to about 10 microns.

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29. The sensor assembly of claim 27, wherein the thin film has a thickness in the range from about 0.05 micron to about 1.0 micron.

The sensor assembly of claim 42, wherein the thin film has a thickness in the range from about 0.1 micron to about 0.5 micron.

A sensor assembly, comprising:

a sensor including sensing element(s) formed of amorphous silicon carbide,

5 whereby the sensor assembly is operable at temperatures up to 1000°C.

A high-temperature sensor assembly, comprising:

a sensing element formed of amorphous silicon carbide; and

electrical circuitry operatively coupled with the sensing element,

said electrical circuitry comprising amorphous silicon carbide doped with at least
10 one dopant selected from the group consisting of n-type and p-type dopants,
whereby the sensor assembly is operable at temperatures up to 1000°C.

A high-temperature pressure sensor, comprising:

a substrate including a reference cavity region;

15 a first highly resistive amorphous silicon carbide thin film deposited on the substrate, but not the reference cavity region;

a second highly resistive amorphous silicon carbide thin film deposited over the first highly resistive thin film, and additionally over the reference cavity region, to form a sealed reference cavity;

a low resistivity amorphous silicon carbide thin film deposited over the second highly resistive thin film, over the region of the sealed reference cavity; and electrodes contacting the low resistivity amorphous silicon carbide thin film, and operatively coupled to a resistance-sensing electrical circuit,

5 whereby changes in resistivity of the low resistivity amorphous silicon carbide thin film incident to changes in strain in the low resistivity amorphous silicon carbide thin film are sensed by the resistance-sensing circuit.

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10 The high-temperature pressure sensor of claim 33, comprising amorphous silicon carbide doped with a dopant species comprising a material selected from the group consisting of hydrogen, halogen, nitrogen, oxygen, sulfur, selenium, transition metals, boron, aluminum, phosphorus, gallium, arsenic, lithium, beryllium, sodium and magnesium.

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15 A VLSI circuit assembly, comprising:
a VLSI electronic circuit including an active circuit structure and a metalization interconnect layer; and
a thin film of amorphous silicon carbide between the active circuit structure and the metalization layer, as a diffusion barrier against diffusion of atoms from the metalization layer into the active circuit structure.

36.

20 A method of forming an article as in claim 1, comprising deposition of said amorphous silicon carbide thin film by a process selected from the group

consisting of chemical vapor deposition, plasma enhanced chemical vapor deposition, RF glow discharge, RF sputtering, ion cluster beam deposition, ion beam sputtering, sol gel coating, reactive sputtering, plasma spray, reactant spraying, microwave discharge, and photo CVD.

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~~37~~. The method of claim 36, wherein said process comprises sputtering.

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~~38~~. The method of claim 36, wherein the amorphous silicon carbide thin film forms a protective coating for the structure.

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